

# Food Safety Workbook for Farmhouse Cheesemakers



This workbook is a joint project between  
the **Food Safety Authority of Ireland** and **Teagasc**



In cooperation with



An Roinn Gnotha Pobail,  
Comhionannais agus Gaeltachta  
Department of Community, Equality  
and Gaeltacht Affairs

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# 01

## Introduction

**This workbook has been produced to assist farmhouse cheesemakers meet their legal obligation to develop and implement a food safety management system based on the principles of HACCP (Hazard Analysis and Critical Control Point), also referred to as HACCP-based procedures. It recognises that such an approach must be underpinned by good hygiene practices. The workbook takes a step by step approach to describing and recording individual operations in cheesemaking, from raw material production/purchasing through to the storage and dispatch of cheese. It will help you to identify and control hazards associated with your operations and to verify that you are controlling these hazards.**

### OBJECTIVE

To enable farmhouse cheesemakers to use this workbook to develop and implement their own HACCP-based procedures for the manufacture of cheese in compliance with food law.

### HACCP-BASED PROCEDURES

The majority of food safety hazards are controlled by adhering to good cheese making practices and by ensuring good structural, operational and personal hygiene. Structural, operational and personal hygiene are referred to as prerequisite hygiene requirements, e.g. condition and upkeep of premises, pest control, cleaning and maintenance etc. (For more details, see Section 4. Prerequisites Hygiene Requirements).

#### A food safety hazard is a:

- Biological agent, e.g. *Salmonella* species
- Chemical agent, e.g. antibiotic residue
- Physical agent, e.g. piece of metal  
(with the potential to cause adverse health effects)

HACCP is used to identify food safety hazards and the steps in your process which are critical to control and monitor so as to ensure safe food. These steps in your process are referred to as Critical Control Points (CCPs). In simple terms, HACCP involves:

- Identifying what can go wrong
- Planning to prevent/control it
- Checking that you are doing what you planned to do

# 02 How to Complete and Implement this Workbook

- 1 Fill in the management commitment box below
- 2 Give details of your business in **Section 3**
- 3 Ensure that you are implementing the prerequisite hygiene requirements in **Section 4**
- 4 In **Section 5**:
  - Identify the steps in your business
  - Identify the hazards and suggested controls relevant to each of these steps
  - Identify the CCPs by answering the questions on page 52 and completing the table on page 54
- 5 Fill in the Declaration of Completion on page 59.
- 6 Implement the controls and keep the records you have identified.
- 7 Regularly check that control is being maintained.
- 8 Review workbook annually or whenever there is a change in your business, e.g. new recipe, new equipment, extension/alterations etc, that is likely to affect food safety.

## MANAGEMENT COMMITMENT

The following personnel are responsible for developing, implementing and maintaining the HACCP-based procedures:

Business owner(s) and those having management or supervisory responsibilities	
Name	
Position	
Name	
Position	
Name	
Position	
Others: (if appropriate)	

# 03 Business Details

<b>Identification Mark</b>	
----------------------------	--

Manufacturing Address
-----------------------

Tel	Email
-----	-------

Milk and cheese premises	Cheese made using own milk Tick as relevant	Cheese made using bought in milk Tick as relevant
Milking animals on same site as cheese production		Not Relevant
Milk cooling, e.g. plate cooler, bulk tank, in-churn cooler. <b>Please specify:</b>		
Milk transport system, e.g. mobile tank, piped, churn <b>Please specify:</b>		
Cheese making - near/in the vicinity of farm facilities, e.g. animal buildings, slurry store, dungsted, silage pit etc. <b>Indicate Yes or No:</b>		
Cheese storage - near/in the vicinity of farm facilities, e.g. animal buildings, slurry store, dungsted, silage pit etc. <b>Indicate Yes or No:</b>		

Staff *	
<b>Total number of staff involved</b>	
Cheese activities only	
Milking only	
Joint livestock and cheese activities	

**\* Note**  
A sample staff responsibilities/ duties record is given on page 56.

Water Tick as relevant	
<b>Type of supply</b>	Mains supply <input type="checkbox"/> Public group scheme <input type="checkbox"/> Private group scheme <input type="checkbox"/> Private supply, e.g. well or borehole <input type="checkbox"/>
<b>On site system protection</b>	Ultraviolet <input type="checkbox"/> Chlorination <input type="checkbox"/> Filter <input type="checkbox"/> No on-site treatment <input type="checkbox"/> Storage facilities adequately protected <input type="checkbox"/>

## Livestock Details

**For completion only where own milk is used to make cheese**

Animals	Cow	Goat	Sheep	Guidance
Herd or flock size				i.e. approx. average (excluding young stock)
Herd/flock mainly self contained				i.e. replacements normally on-farm reared
Bought in stock known source				i.e. replacements from known source
or Bought in stock open market				i.e. replacements from dealer or market
Other livestock on site, e.g. poultry, horses etc				

### Animal Health and Animal Remedies

Only milk from animals meeting the legislative health, treatment and processing requirements set out in Appendix 1 is used for cheese production.

**Indicate Yes or No:** \_\_\_\_\_

**Note**

The following is a recommendation from a Food Safety Authority of Ireland report on tuberculosis – *["Milk intended to be consumed, or to be further processed, without prior heat treatment, i.e. pasteurisation or equivalent heat treatment, should come from registered herds or flocks that are subject to an official tuberculosis control plan. In the case of cattle, the control plan should include herd inspection and herd testing for tuberculosis every six months to minimise the risk of delay in detecting infected animals. Likewise, goat herds and sheep flocks kept for milk production should be subject to an official tuberculosis control plan that addresses public health concerns in terms of food safety."]*

### Other non-statutory policies/controls (if appropriate) e.g. testing for pathogens, vaccination etc

# Product(s) Description and Other Information

<b>Cheese name</b>				
<b>Generic type of production, e.g. fresh, soft, mould-ripened, smear-ripened, hard, animal species, i.e. cows, goats or sheep</b>				
<b>Raw/lower heat treatment than pasteurisation (please specify time and temp _____)/pasteurised milk</b>				
<b>Own or bought in milk or both</b>				
<b>Age at maturity</b>				
<b>pH</b>				
<b>Moisture content and/or available water (<math>a_w</math>), where available</b>				
<b>Salt content</b>				
<b>Added ingredients, e.g. herbs, seaweed, fruit etc. or process, e.g. smoking</b>				
<b>Shelf-life</b>				
<b>Production level, i.e. approx % of overall production</b>				
<b>List the intended use(s), e.g. (a) ready for consumption; (b) further maturation; (c) for cheese processing; (d) as an ingredient; (e) and/or other (please specify)</b>				



## Supplier List

Supplies	Name and address of supplier(s)
Bought in milk or curd	
Starter	
Rennet	
Other cultures, e.g. mould, smear etc	
Herbs/spices	
Salt/brine	
Packaging and processing materials in contact with the cheese, e.g. wax, cloth, moulds, smoke, ink labels, bags, boxes etc. Note: All materials, including packaging, should be in compliance with food law.	
Cleaning products, sterilisers and disinfectants  Note: All products should be suitable for use in food premises.	
Other, e.g. acid for altering pH of brine  Acidity regulators should be compliant with EU legislation	

**Note:** The product specifications should be maintained for all ingredients purchased and all materials used should be in compliance with EU legislation

# 04

## Introduction

**Hygienic premises and staff practices form the foundation of your HACCP-based procedures. These are known as prerequisite hygiene requirements and will control the majority of hazards that you encounter in your business.**

**The following tables detail the typical structural, operational, and personal hygiene controls which should be in place in a cheesemaking premises. In Section 5 (HACCP), you will identify hazards specific to each step in the cheesemaking process.**

### **HOW TO COMPLETE THIS SECTION**

Work through each table in this section and tick the controls that you have in place. If you identify something you aren't doing or should be doing differently or better, list it in the table on page 22 and set a deadline for introducing it into your premises/operations.

# Premises, Equipment, Facilities, Services, and Maintenance

What can go wrong	Control Measure	Tick if measure is in place
<p>Inadequate or poorly designed, sited, constructed or maintained <b>premises, equipment, facilities, maintenance and services</b> can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination</p>	<p><b>Premises</b></p> <ul style="list-style-type: none"> <li>• The premises are sited and designed in a manner which prevents contamination from the surrounding environment</li> <li>• The space is big enough and suitably laid out to allow hygienic operations (Note: it is recommended that you draw a floor plan of the work flow in your premises. See sample floor plan on page 23)</li> <li>• The walls, floors and ceilings are maintained in a sound condition and are easy to clean and where necessary, to disinfect</li> <li>• Rooms have suitable ventilation to prevent moisture build-up</li> <li>• The premises are maintained in good repair</li> <li>• If the farm facilities, e.g. animal buildings, slurry store, dungsteds, silage pit etc, are adjacent to the cheese room, there are controls in place to prevent contamination, e.g. via drains</li> </ul>	<p style="text-align: center;"> <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/> </p>
	<p><b>Equipment and utensils</b></p> <ul style="list-style-type: none"> <li>• Constructed of smooth, corrosion resistant and non-toxic materials</li> <li>• Installed in a manner that allows adequate cleaning including surrounding areas</li> <li>• Capable of being effectively cleaned, disinfected (as appropriate) and maintained</li> <li>• Arrangements exist for the correct storage and protection of equipment and utensils between use</li> <li>• Equipment which requires calibration is regularly calibrated, e.g. pH meter, thermometer, temperature control of the pasteuriser etc</li> </ul>	<p style="text-align: center;"> <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/> </p>

What can go wrong	Control Measure	Tick if measure is in place
<p>Inadequate or poorly designed, sited, constructed or maintained <b>premises, equipment, facilities, maintenance and services</b> can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination</p>	<p><b>Facilities</b></p> <ul style="list-style-type: none"> <li>• Adequately ventilated hygienic facilities, i.e. toilets, wash-hand basin supplied with hot and cold water, materials for cleaning hands, hygienic hand drying facilities and an area to change and store clothes, are available and properly maintained</li> <li>• Adequate facilities for storage of cleaning agents and disinfectants</li> </ul>	<p><input type="checkbox"/> <input type="checkbox"/></p>
	<p><b>Services</b></p> <ul style="list-style-type: none"> <li>• An adequate and protected water supply of potable quality is available</li> <li>• Clean air circulation unit, e.g. humidifier</li> </ul>	<p><input type="checkbox"/> <input type="checkbox"/></p>
	<p><b>Maintenance</b></p> <ul style="list-style-type: none"> <li>• The premises, equipment, facilities and services are maintained in good repair</li> </ul>	<p><input type="checkbox"/></p>



# Staff Training and Supervision

What can go wrong	Control Measure	Tick if measure is in place
<p>Insufficiently <b>trained or supervised staff</b> can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination</p>	<ul style="list-style-type: none"> <li>• Receive training and/or instruction to ensure that they have sufficient understanding of food safety/food hygiene to enable them to carry out their duties in a hygienic manner</li> <li>• Who are responsible for the development of this workbook understand the principles of HACCP</li> <li>• Are regularly supervised to ensure that they implement hygienic practices</li> <li>• Keep records of formal, e.g. external course, and informal, e.g. in-house or on the job, training are kept (<i>see example of staff training record on page 25</i>)</li> </ul> <p><b>Note</b> Details of the skills food handlers should have are outlined in the FSAI Training Guides – Level 1 Induction Skills; Level 2 Additional Skills and Level 3 Food Safety Skills for Management</p>	<p style="text-align: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> </p>







# Pest and Waste Control

What can go wrong	Control Measure	Tick if measure is in place
<p>Inadequate <b>pest control</b> or <b>waste control</b> can lead to contamination, survival or growth of harmful bacteria; chemical or physical contamination</p>	<p><b>On the farm:</b></p> <ul style="list-style-type: none"> <li>• Protect animal feed, especially straights or compound feeds, from pest infestation including birds</li> <li>• Keep the parlour, dairy and surrounding areas clean and tidy and protect from pests as required</li> <li>• Keep accumulations of slurry and farm yard manure to a minimum</li> <li>• Act to reduce fly populations</li> <li>• Make a formal inspection each month for signs of rodents and act if found</li> </ul> <p><b>Cheesemaking:</b></p> <ul style="list-style-type: none"> <li>• Promptly remove any rubbish, debris or cheese waste (in particular curds and whey) to containers protected from pests</li> <li>• Store any cheese ingredients and packaging materials in a pest-free environment</li> <li>• Keep doors closed and ensure other openings are protected from pests, e.g. flies, birds, rats etc</li> <li>• Keep the premises clean and tidy, adopting a 'clean as you go' policy</li> <li>• Clean drains and channels daily to remove cheese waste and avoid standing water</li> <li>• Ensure that insect traps work correctly and that the location of the insectocutor will not lead to contamination of the cheesemaking process</li> <li>• Inspect all incoming raw materials/ingredients for signs of pests</li> <li>• Store cheese or ingredients away from walls, to allow cleaning and inspections</li> <li>• Make formal inspections each week for signs of rodents or cheese mites</li> <li>• Be aware of any indication of pest infestation and know what to do</li> </ul>	<p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>    <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>    <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>    <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </p>

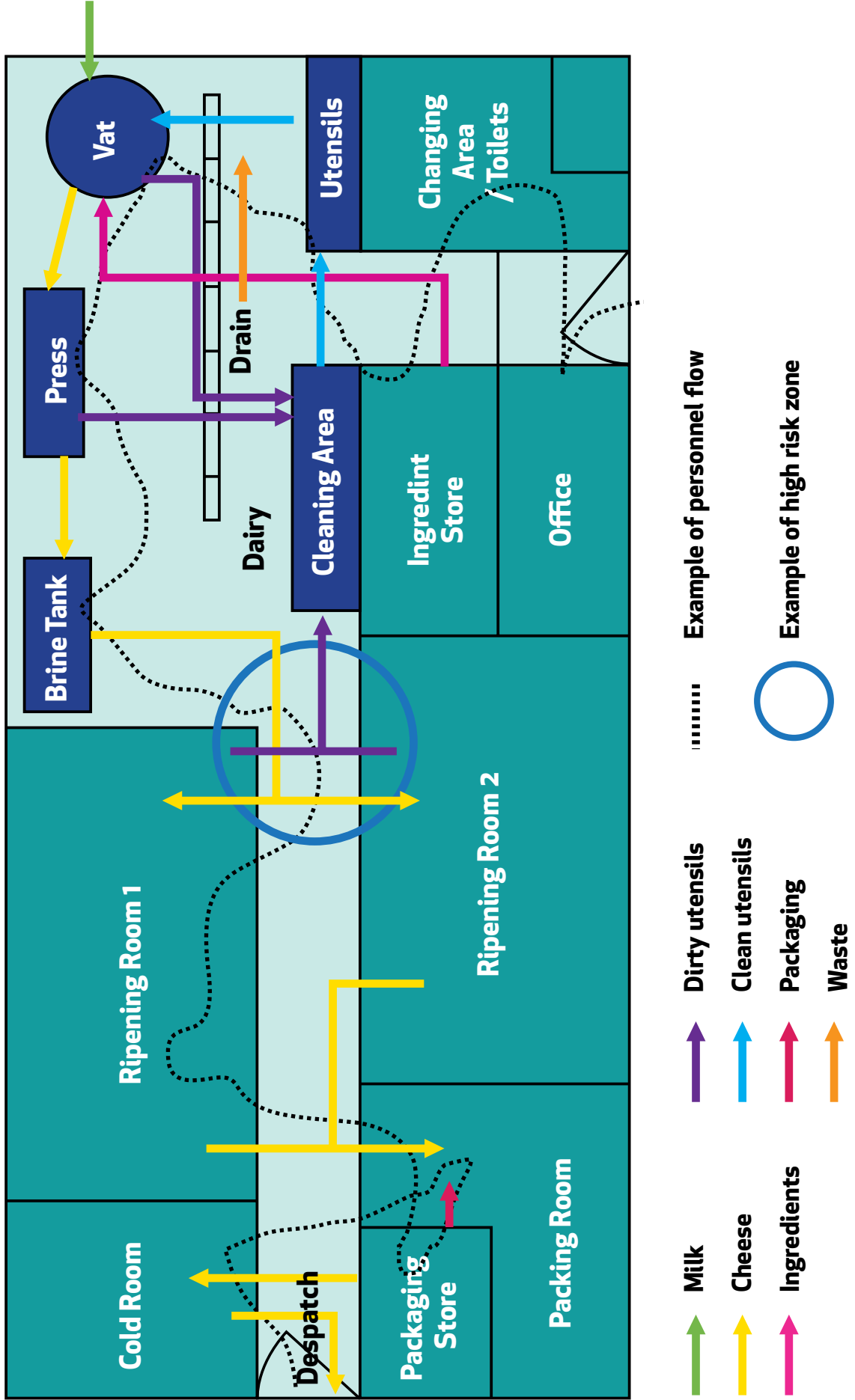
# Traceability and Recall Procedures

What can go wrong	Control Measure	Tick if measure is in place
<p>Unsafe cheese may reach the consumer if these procedures are not in place</p>	<p>Have traceability and recall procedures in place which permit identification of and withdrawal/recall of contaminated batches of cheese</p> <p><b>Supplier traceability:</b> Keep a record of the ingredients and packaging you receive from your suppliers. Specifically keep a record of the:</p> <ul style="list-style-type: none"> <li>- Supplier's contact details</li> <li>- Ingredient and packaging description including quantity and batch number (if available)</li> <li>- Date of transaction</li> </ul> <p><b>Customer traceability:</b> Keep a record of the customers to whom you have sold your produce (excluding sales to the final consumer). Specifically keep a record of the:</p> <ul style="list-style-type: none"> <li>- Customer's contact details</li> <li>- Product description including quantity and batch number(s)</li> <li>- Date of transaction</li> </ul> <p><b>Withdrawal/recall:</b></p> <ul style="list-style-type: none"> <li>- Immediate withdrawal of affected cheese from the market and, if necessary, recall from consumers</li> <li>- Immediately inform your dairy produce inspector (DPI) of the incident</li> </ul> <p><b>Note</b> See FSAI Guidance Note No. 10- Product Recall and Traceability for further details.</p>	<p style="text-align: center;"> <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/> </p> <p style="text-align: center;"> <input type="checkbox"/>   <input type="checkbox"/>   <input type="checkbox"/> </p> <p style="text-align: center;"> <input type="checkbox"/>   <input type="checkbox"/> </p>

# Summary of Improvements or Changes Required

Prerequisite Area	Control Measure to be Introduced/Change	Deadline

# Example of Work Flow/Floor Plan in a Cheesemaking Operation



# Example of a Cleaning Schedule

Item to be cleaned	Frequency of cleaning e.g. after use/daily, weekly etc	Method of cleaning	Chemical(s) to be used (including dilution required)	Person responsible
e.g. vat	e.g. daily	e.g. hand brushing	e.g. iodine solution at manufacturers recommended rate	e.g. Joe Bloggs

## Example of a Staff Training Record

Name
Position
Date of Employment

Nature of training	Date	In-house trainer or course provider	Employee signature

# 05 Introduction

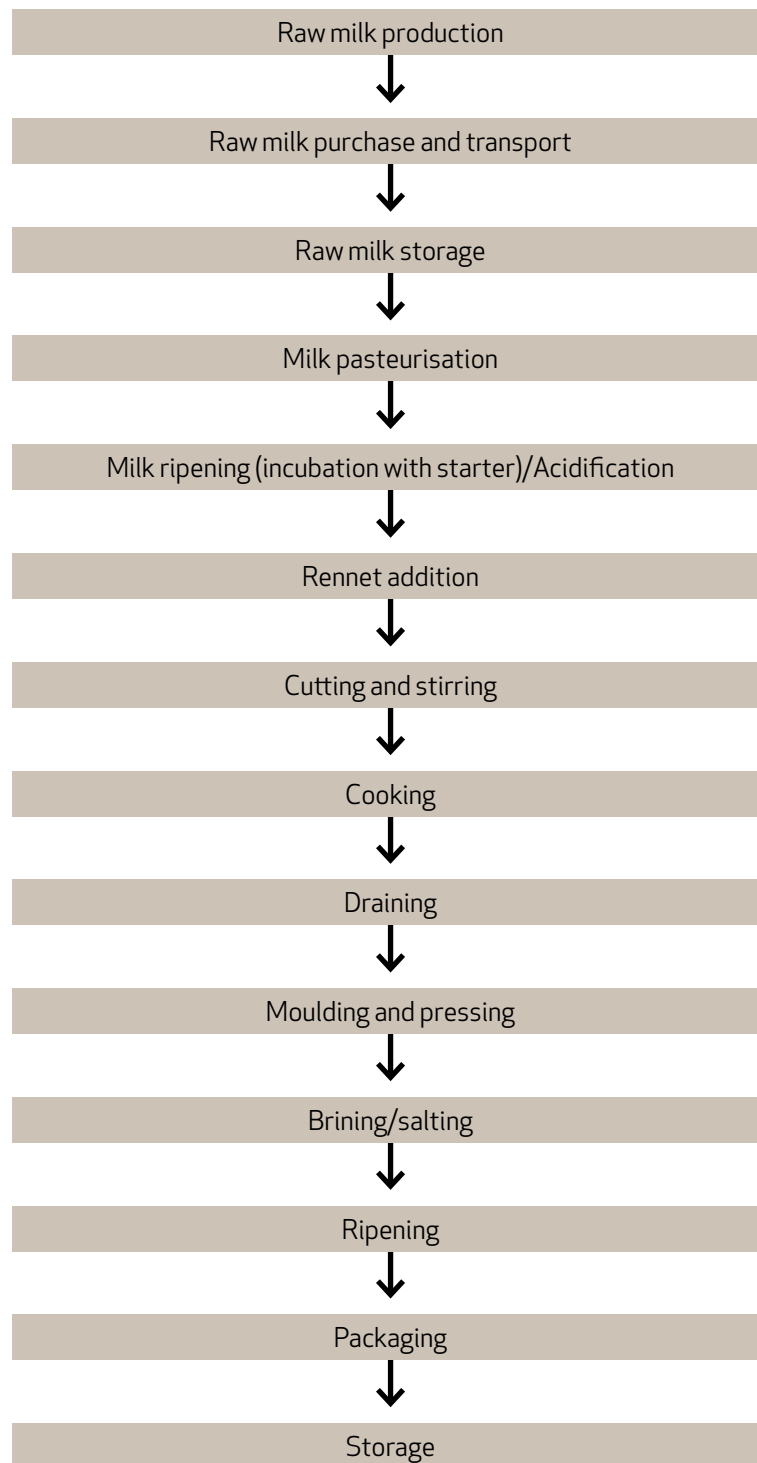
**Hygienic premises and staff practices form the foundation of your HACCP-based procedures. These are called Prerequisite Hygiene Requirements and were identified in Section 4. In this section you will identify hazards specific to steps in the cheesemaking process and identify how to control these hazards. You will specifically identify the steps which are critical to ensuring the safety of your cheese, i.e. CCPs, and how you will monitor and verify that control is maintained.**

## HOW TO COMPLETE THIS SECTION

- 1** Tick the steps relevant to your business in the table below. To ensure that you do not forget any steps, you should draw a detailed flow diagram of the steps for each of the cheeses you produce. (See example of a flow chart in a cheesemaking operation on **page 28**).
- 2** Go to the hazard analysis section (**pages 30 to 51**) and identify the hazards in each of these steps in your business and the appropriate controls.
- 3** Go to **page 52** and identify the CCPs in your business by answering the three questions.
- 4** Complete the summary CCP table on **page 54**.

No.	Step	Tick where relevant to your cheese(s)
1	Raw milk production	
2	Milk purchase and transport	
3	Milk storage in bulk tank and transfer to pasteuriser/cheese vat	
4	Milk pasteurisation	
5	Non-milk ingredients	
6	Acidification	
7	Curds, salting, moulding and pressing	
8	Ripening or maturation	
9	Cutting, packaging and storage	
10	Additional step(s), <b>i.e. not covered in this workbook for which you will have to conduct your own hazard analysis.</b> Please specify below	

## Example of a Flow Chart of Cheese Manufacturing Steps





# Flow chart

**Draw a flow chart for each of your cheese(s)**

# Hazard Analysis

This section presents: **(1) Typical hazards in cheesemaking**  
**(2) Identification and control of hazards in your business**

## (1) TYPICAL HAZARDS IN CHEESEMAKING (Note: this list is not exhaustive)

Number	Step
<b>Biological hazards</b> i.e. pathogenic microorganisms	<p><b>Notable pathogens for cheese are:</b></p> <ul style="list-style-type: none"> <li>- <i>Salmonella</i> species</li> <li>- <i>Listeria monocytogenes</i></li> <li>- Pathogenic <i>E. coli</i>, e.g. <i>E. coli</i> O157</li> <li>- Coagulase positive staphylococci, e.g. <i>Staphylococcus aureus</i></li> <li>- <i>Mycobacterium bovis</i> which causes tuberculosis (TB)</li> <li>- Additional pathogens relevant to your cheese (please specify):</li> </ul> <hr/> <p><b>Key pathogen sources include:</b></p> <ul style="list-style-type: none"> <li>- Milking livestock</li> <li>- Other livestock, especially calves, pigs or poultry</li> <li>- Staff</li> <li>- Pests and domestic pets</li> <li>- Environment</li> <li>- Water</li> </ul> <p><b>Pathogens may be introduced by:</b></p> <ul style="list-style-type: none"> <li>- Cross-contamination from any livestock</li> <li>- Contamination of raw or pasteurised milk either during milking or during processing</li> <li>- Inadequate pasteurisation of milk (if applied)</li> <li>- Contamination during manufacture from:               <ul style="list-style-type: none"> <li>- Inadequately cleaned and/or disinfected equipment</li> <li>- Poor hygiene practices or operator illness</li> <li>- Pest infestation</li> <li>- The environment</li> </ul> </li> <li>- Growth or survival of pathogens due to:               <ul style="list-style-type: none"> <li>- Incorrect cheese acidification</li> <li>- Inadequate temperature controls at any stage</li> <li>- Incorrect stock management</li> <li>- Intrinsic nature of the cheese</li> </ul> </li> </ul>
<b>Chemical hazards</b>	<p>In particular: antibiotic or veterinary drug residues, cleaning chemicals, agro chemicals, oils and lubricants, refrigerants, packaging residues, <b>other</b> (please specify):</p> <hr/>
<b>Physical hazards</b>	<p>In particular: metal and non-metal foreign bodies including paper, wrapping materials, packaging, glass fragments, clothing, hair, bristles, flying insects, dressing, personal belongings, e.g. mobile phones, <b>other</b> (please specify):</p> <hr/>

## (2) IDENTIFICATION AND CONTROL OF HAZARDS IN MILK PRODUCTION AND CHEESEMAKING STEPS

**Note 1:** The following tables enable you to **identify and control hazards** in your business

**Note 2:** A number of different records are listed in the 'Documentation' column in these tables. In practice, much of what you need to record can be stored in your **cheesemaking / production log or diary** (see sample log on page 55).

**Step 1. Raw milk production**

<b>Hazard</b> What can go wrong	<b>Control Measure</b> (Tick where measure is in place)	<b>Documentation</b> (Tick where measure is in place)
<p><b>Contamination by harmful bacteria</b></p> <ul style="list-style-type: none"> <li>- Animal husbandry:                             <ul style="list-style-type: none"> <li>- Animal disease</li> <li>- Soiled milking animals</li> <li>- Udder infections</li> <li>- Contaminated animal feed</li> </ul> </li> <li>Milking methods:                             <ul style="list-style-type: none"> <li>- Unhygienic milking practices</li> <li>- Unclean udders</li> <li>- Unclean milking equipment</li> </ul> </li> <li>- Cross-contamination from:                             <ul style="list-style-type: none"> <li>• Other animals/ environment</li> </ul> </li> </ul> <p><b>Chemical contamination</b></p> <ul style="list-style-type: none"> <li>- Antibiotics</li> <li>- Animal treatments</li> <li>- Teat disinfectants</li> <li>- Cleaning chemicals</li> <li>- General farm disinfectants</li> </ul> <p><b>Foreign body contamination</b></p> <ul style="list-style-type: none"> <li>- Inadequate milk filtration</li> </ul>	<p><b>To prevent, eliminate or reduce hazards ensure:</b></p> <ul style="list-style-type: none"> <li>• Good animal health and disease control <input type="checkbox"/></li> <li>• Good animal housing management <input type="checkbox"/></li> <li>• Mastitis control <input type="checkbox"/></li> <li>• Clean loafing/grazing conditions <input type="checkbox"/></li> <li>• Clean source and protection of animal feed <input type="checkbox"/></li> <li>• Clean milking techniques <input type="checkbox"/></li> <li>• Good teat hygiene <input type="checkbox"/></li> <li>• Detection and rejection of abnormal milk <input type="checkbox"/></li> <li>• Prompt and effective cleaning of milking equipment and regular maintenance <input type="checkbox"/></li> <li>• Observe all animal remedy withdrawal periods <input type="checkbox"/></li> <li>• Identify treated animals and withdraw antibiotic milk <input type="checkbox"/></li> <li>• Observe withdrawal period for other animal treatments <input type="checkbox"/></li> <li>• Use teat dips according to manufacturer's instructions <input type="checkbox"/></li> <li>• Ensure equipment, utensils and surfaces are rinsed adequately <input type="checkbox"/></li> <li>• Do not use phenolic compounds near dairy, milking facilities or dairy animal housing <input type="checkbox"/></li> <li>• Effective milk filtration in place:                             <ul style="list-style-type: none"> <li>- Change milk socks after each milking and/or clean and disinfect re-usable milk filters <input type="checkbox"/></li> </ul> </li> </ul>	<p><b>Examples of control evidence:</b></p> <ul style="list-style-type: none"> <li>• Animal remedies record book and herd register <input type="checkbox"/></li> <li>• Herd health and veterinary records <input type="checkbox"/></li> <li>• Mastitis records <input type="checkbox"/></li> <li>• Milking machine test reports <input type="checkbox"/></li> <li>• Feed supplier assurances <input type="checkbox"/></li> <li>• Raw milk test results:                             <ul style="list-style-type: none"> <li>- Plate counts and bovine somatic cell counts (SCC), and CMT (California Mastitis Test) or similar. Legal requirement of at least 2 samples per month for Plate Count for at least                                     <ul style="list-style-type: none"> <li>- A) 1 SCC sample for bovines <input type="checkbox"/></li> <li>- B) 2 samples per month for plate count for all other species <input type="checkbox"/></li> </ul> </li> <li>- Periodic pathogen testing (in particular after colostrum). Note: This is a control raw milk cheesemakers may consider <input type="checkbox"/></li> </ul> </li> <li>• Animal remedies records <input type="checkbox"/></li> <li>• Periodic raw milk antibiotic test results <input type="checkbox"/></li> <li>• Evidence of cleaning procedures <input type="checkbox"/></li> </ul>

**Variations from or additions to stated hazards and controls listed on previous page for step 1**

<b>Hazard</b> What can go wrong	<b>Control Measure</b> Method of prevention	<b>Documentation</b> Evidence of control

**Step 1. Required improvements**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

**Step 2. Milk purchase and transport [Raw] [Pasteurised]**

<b>Hazard</b> What can go wrong	<b>Control Measure</b> (Tick where measure is in place)	<b>Documentation</b> (Tick where measure is in place)
<p><b>Contamination by harmful bacteria, chemicals and foreign bodies</b>                      Hazards same as raw milk production (Step 1) and raw milk storage (Step 3)</p> <p><b>Additional hazards</b></p> <ul style="list-style-type: none"> <li>- Contamination during milk transport</li> <li>- Multiplication of harmful bacteria or toxin production during transport</li> </ul> <p><b>Pasteurised milk</b></p> <ul style="list-style-type: none"> <li>- Inadequate pasteurisation</li> </ul>	<p><b>To prevent, eliminate or reduce hazards:</b></p> <ul style="list-style-type: none"> <li>• Ensure supplier knows the standards that are required <input type="checkbox"/></li> <li>• Ensure supplier is aware of what the milk will be used for <input type="checkbox"/></li> <li>• Periodic inspection of the production premises (Step 1 and 3 controls) <input type="checkbox"/></li> <li>• Periodic microbiological results of the milk at receipt <input type="checkbox"/></li> <li>• Sealed transport tanks/containers/pipes <input type="checkbox"/></li> <li>• Reject any liquid milk consignment, which:                             <ul style="list-style-type: none"> <li>- Has an abnormal smell and appearance <input type="checkbox"/></li> <li>- Is delivered in a vessel which is visually soiled <input type="checkbox"/></li> <li>- Has been not been adequately protected <input type="checkbox"/></li> <li>- Has an excessive storage time <input type="checkbox"/></li> </ul> </li> <li>• Reject any milk which is delivered at a temperature above 10°C (legal limit is 10°C but storage below 6°C is best practice) unless it will be used within 2 hours of milking <input type="checkbox"/></li> <li>• Reject consignments of frozen raw milk, which:                             <ul style="list-style-type: none"> <li>- Is delivered at a temperature above -18°C (for goat milk) <input type="checkbox"/></li> <li>- Is not marked with a traceable batch code <input type="checkbox"/></li> <li>- Shows any signs of damaged packaging <input type="checkbox"/></li> </ul> </li> <li>• Assurances of correct heat treatment <input type="checkbox"/></li> </ul>	<p><b>Examples of control evidence</b></p> <ul style="list-style-type: none"> <li>• Supplier assurances of compliance with raw milk production (Step 1) and draw milk storage (Step 3) <input type="checkbox"/></li> <li>• Record of visits and inspections made <input type="checkbox"/></li> <li>• Copies of milk test results:                             <ul style="list-style-type: none"> <li>- Plate counts and bovine somatic cell counts and CMT (California Mastitis Test) or similar <input type="checkbox"/></li> <li>- Periodic pathogen testing (in particular after colostrum). <i>Note: This is a control raw milk cheesemakers may consider</i> <input type="checkbox"/></li> </ul> </li> <li>• Supplier assurances of compliance with transport requirements <input type="checkbox"/></li> <li>• Delivery record (or delivery docket) to include:                             <ul style="list-style-type: none"> <li>- Condition of milk upon receipt <input type="checkbox"/></li> <li>- Temperature, date and volume <input type="checkbox"/></li> <li>- Consignment rejection <input type="checkbox"/></li> </ul> </li> <li>• Phosphatase test results or certificate of assurance <input type="checkbox"/></li> </ul>

**Variations from or additives to stated hazards and controls listed on previous page for step 2**

Hazard What can go wrong	Control Measure Method of prevention	Documentation Evidence of control

**Step 2. Required improvements**

Step	Control measure to be introduced/changed	Deadline

**Step 3. Milk storage in bulk tank and transfer to pasteuriser/cheese vat [Raw] [Pasteurised]**

<b>Hazard</b> What can go wrong	<b>Control Measure</b> (Tick where measure is in place)	<b>Documentation</b> (Tick where measure is in place)
<p><b>Contamination by harmful bacteria</b></p> <ul style="list-style-type: none"> <li>- Contamination from the environment</li> <li>- Contaminated milk storage vessels</li> <li>- Contaminated pipe work used to transport milk to pasteuriser/cheese vat</li> </ul> <p><b>Growth of harmful bacteria and/or production of toxins</b></p> <ul style="list-style-type: none"> <li>- Stored warm milk</li> <li>- Prolonged storage</li> <li>- Inadequate milk freezing:</li> <li>- Delayed freezing</li> <li>- Temperature rise</li> </ul> <p><b>Foreign body contamination</b></p> <ul style="list-style-type: none"> <li>- Insects, dust or debris</li> </ul>	<p><b>To prevent, eliminate or reduce hazards ensure:</b></p> <ul style="list-style-type: none"> <li>• Milk storage vessels are covered <input type="checkbox"/></li> <li>• Prompt and effective cleaning of storage vessels and pipe work <input type="checkbox"/></li> <li>• Use disposable churn liners <input type="checkbox"/></li> <li>• Protect and drain equipment between use and clean milk pumps <input type="checkbox"/></li> <li>• For on-farm cheese production, un-cooled milk is used within 2 hrs of milking <input type="checkbox"/></li> <li>• For milk sourced from another holding (ex-farm milk), uncooled milk is delivered to cheese facility and used for cheese making immediately after milking <input type="checkbox"/></li> <li>• Ex-farm refrigerated (&lt; 8°C-daily collection, &lt; 6°C-if not daily) milk, delivered at not more than 10°C, is used for cheese making within 4 hrs of delivery if stored &lt; 10°C <input type="checkbox"/></li> <li>• Ex-farm refrigerated (&lt; 8°C-daily collection, &lt; 6°C -if not daily) milk, delivered at not more than 6°C upon acceptance at cheese facility (&lt; ____ °C) &amp; kept at that temperature until cheese making <input type="checkbox"/></li> </ul> <p>In the case of cheese produced from heat treated cows' milk:</p> <ul style="list-style-type: none"> <li>• If storage period of raw cows' milk from acceptance to commencement of cheese making exceeds that determined by HACCP-based procedures (____ hrs), then the TBC must be &lt; 300,000 (If TBC limit is exceeded, then corrective action required and DPl must be notified) <input type="checkbox"/></li> <li>• If storage period from time of heat treatment to commencement of cheese making exceeds that as determined by HACCP based procedures (____ hrs), then the TBC must be &lt; 100,000 (If TBC limit is exceeded, then corrective action required and DPl must be notified) <input type="checkbox"/></li> <li>• Vessel(s) protected when containing milk and after cleaning <input type="checkbox"/></li> </ul>	<p><b>Control evidence is assisted by</b></p> <ul style="list-style-type: none"> <li>• Cleaning schedule and record <input type="checkbox"/></li> <li>• Cheesemaking/production log <input type="checkbox"/></li> <li>• Cheesemaking/production log <input type="checkbox"/></li> <li>• Daily temperature log <input type="checkbox"/></li> <li>• Cheesemaking/production log <input type="checkbox"/></li> <li>• Cheesemaking/production log <input type="checkbox"/></li> <li>• Daily temperature log <input type="checkbox"/></li> </ul>



**Variations from or additions to stated hazards and controls listed on previous page for step 3**

<b>Hazard</b> What can go wrong	<b>Control Measure</b> Method of prevention	<b>Documentation</b> Evidence of control

**Step 3. Required improvements**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

**Step 4. Milk pasteurisation**

(see Appendix 2 for criteria for cows' milk immediately before pasteurisation)

<b>Hazard</b> What can go wrong	<b>Control Measure</b> (Tick where measure is in place)	<b>Documentation</b> (Tick where measure is in place)
<p><b>Survival of harmful bacteria</b> Insufficient heat treatment:</p> <ul style="list-style-type: none"> <li>- Inadequate temperature</li> <li>- Inadequate holding time</li> </ul>	<p><b>To prevent, eliminate or reduce hazards</b></p> <p>*HTST systems (minimum of 72° C for 15 secs)</p> <p>Actual time/temperature _____ °C _____ secs</p>	<p><b>Control evidence is assisted by</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Confirmation of temp/time</li> <li><input type="checkbox"/> Thermograph chart – record FDV test</li> </ul>
<p><b>Contamination by harmful bacteria</b> Post pasteurisation contamination:</p> <ul style="list-style-type: none"> <li>- HTST plate leaks (raw milk)</li> <li>- Inadequate plant cleaning</li> </ul>	<p><b>Adequate temperature is obtained by</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Daily test of flow diversion valve (FDV)</li> <li><input type="checkbox"/> Daily check of hot indicating pen</li> <li><input type="checkbox"/> Regular calibration of all temperature control and monitoring devices</li> <li><input type="checkbox"/> Regular plant servicing</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Operating procedures and training</li> <li><input type="checkbox"/> Phosphatase test results</li> <li><input type="checkbox"/> Calibration/service record</li> <li><input type="checkbox"/> Invoice/commission report</li> <li><input type="checkbox"/> Record of milk flow rate tests</li> <li><input type="checkbox"/> Confirmation of time/temp</li> <li><input type="checkbox"/> Thermograph chart</li> <li><input type="checkbox"/> Calibration record</li> <li><input type="checkbox"/> Manual record (temperature/time)</li> <li><input type="checkbox"/> Phosphatase test results</li> <li><input type="checkbox"/> Calibration/service record</li> </ul>
<p><b>Growth of harmful bacteria and/or production of toxins</b></p> <ul style="list-style-type: none"> <li>- Warm stored pasteurised milk (&gt;5°C)</li> </ul>	<p><b>Adequate holding time is obtained by</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Correct design and installation</li> <li><input type="checkbox"/> Milk flow rate tests</li> </ul> <p>Batch systems (63° C for 30 mins)</p> <p>Actual time/temperature _____ °C _____ secs</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Record of milk flow rate tests</li> <li><input type="checkbox"/> Confirmation of time/temp</li> <li><input type="checkbox"/> Thermograph chart</li> <li><input type="checkbox"/> Calibration record</li> <li><input type="checkbox"/> Manual record (temperature/time)</li> <li><input type="checkbox"/> Phosphatase test results</li> <li><input type="checkbox"/> Calibration/service record</li> </ul>
	<p><b>Adequate temperature and time are assured by:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Visual monitor of the thermograph/temperature gauge</li> <li><input type="checkbox"/> Correct heater thermostat setting</li> <li><input type="checkbox"/> Supervision to ensure minimum heating time</li> <li><input type="checkbox"/> Regular calibration of all temperature control and monitoring devices</li> <li><input type="checkbox"/> Good plant and equipment condition</li> <li><input type="checkbox"/> Correct cleaning routines in place</li> <li><input type="checkbox"/> Immediately use for cheesemaking</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Microbiological and phosphatase results</li> <li><input type="checkbox"/> Thermograph chart</li> <li><input type="checkbox"/> Cheese/production log or diary record</li> </ul>

**\* High Temperature Short Time**

**Variations from or additions to stated hazards and controls listed on previous page for step 4**

<b>Hazard</b> What can go wrong	<b>Control Measure</b> Method of prevention	<b>Documentation</b> Evidence of control

**Step 4. Required improvements**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

**Step 5. Non-milk ingredients**

Hazard (What can go wrong)	Control Measure (Tick where measure is in place)	Documentation (Tick where measure is in place)
<p><b>Contamination by harmful bacteria or toxins may occur:</b></p> <ul style="list-style-type: none"> <li>• In any ingredient used in the cheesemaking process or added to the cheese, e.g.               <ul style="list-style-type: none"> <li>- Starter</li> <li>- Rennet</li> <li>- Salt</li> <li>- Additives, e.g. nitrates</li> <li>- Herbs, spices, fruit</li> <li>- Mould, smear cultures</li> <li>- Water</li> <li>- Other</li> </ul> </li> <li>• During storage, after receipt</li> </ul>	<p><b>To prevent, eliminate or reduce hazards</b></p> <ul style="list-style-type: none"> <li>• Use reputable suppliers for all ingredients <input type="checkbox"/></li> <li>• Obtain supplier assurances of:               <ul style="list-style-type: none"> <li>- Ingredient performance and quality <input type="checkbox"/></li> <li>- Product specification <input type="checkbox"/></li> </ul> </li> <li>• Ensure plant-based ingredients are washed and if necessary, treated, e.g. boiling <input type="checkbox"/></li> <li>• Periodic testing of water supplies <input type="checkbox"/></li> <li>• Store and use according to manufacturer's instructions <input type="checkbox"/></li> <li>• Check starter cultures for signs of clumping (which may indicate that thawing took place) <input type="checkbox"/></li> <li>• Goods in procedures - rejection of any consignment which:               <ul style="list-style-type: none"> <li>- Is delivered above any required temperature <input type="checkbox"/></li> <li>- Cannot be used within any stated 'use-by' date <input type="checkbox"/></li> <li>- Is not marked with a traceable batch code <input type="checkbox"/></li> <li>- Shows any signs of damaged packaging <input type="checkbox"/></li> <li>- Is not accompanied with a consignment note <input type="checkbox"/></li> </ul> </li> <li>• Good stock control <input type="checkbox"/></li> <li>• Ensure additives, e.g. nitrates, are added at the correct concentration <input type="checkbox"/></li> </ul>	<p><b>Examples of control evidence:</b></p> <ul style="list-style-type: none"> <li>• Supplier sales/product literature <input type="checkbox"/></li> <li>• Supplier assurances <input type="checkbox"/></li> <li>• Ingredient specifications <input type="checkbox"/></li> <li>• Cheese recipes indicating the need for washing/other treatments of ingredients <input type="checkbox"/></li> <li>• Water analysis results <input type="checkbox"/></li> <li>• Manufacturers' instructions <input type="checkbox"/></li> <li>• Delivery record (or delivery docket) to include:               <ul style="list-style-type: none"> <li>- Batch codes and dates <input type="checkbox"/></li> <li>- Consignment rejection <input type="checkbox"/></li> </ul> </li> <li>• Cheese/production log or diary record <input type="checkbox"/></li> </ul>
<p><b>Growth of harmful bacteria due to</b></p> <ul style="list-style-type: none"> <li>- Incorrect starter storage</li> <li>- Expired 'use-by' date</li> </ul>		
<p><b>Chemical contamination</b></p>		

**Variations from or additions to stated hazards and controls listed on previous page for step 5**

<b>Hazard</b> What can go wrong	<b>Control Measure</b> Method of prevention	<b>Documentation</b> Evidence of control

**Step 5. Required improvements**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

**Step 6. Acidification (very important step, especially for raw milk cheese)**

Hazard (What can go wrong)	Control Measure (Tick where measure is in place)	Documentation (Tick where measure is in place)
<p><b>Growth/survival of harmful bacteria</b> Inadequate/slow acid development due to:</p> <ul style="list-style-type: none"> <li>- Slow activity of starter organisms</li> <li>- Incorrect incubation conditions</li> <li>- Low addition rate</li> <li>- Incorrect bacterial starter strains</li> <li>- Inhibitory substances</li> <li>- Contamination by bacteriophage</li> </ul> <p>Contamination of unused starter culture during vat inoculation</p>	<p><b>To prevent, eliminate or reduce hazards</b></p> <ul style="list-style-type: none"> <li>• Correct acid development:               <ul style="list-style-type: none"> <li>- Use reputable starter supplier (Step 5) <input type="checkbox"/></li> <li>- Correct storage of starter <input type="checkbox"/></li> <li>- Ensure milk is at the correct temperature when adding starter <input type="checkbox"/></li> <li>- Define starter type <input type="checkbox"/></li> <li>- Use milk free of antibiotics and other veterinary drugs (Steps 1 and 2) <input type="checkbox"/></li> <li>- Rotate starter <input type="checkbox"/></li> </ul> </li> <li>• Corrective action in the event of slow acid development, e.g.               <ul style="list-style-type: none"> <li>- Check pH meter is working <input type="checkbox"/></li> <li>- Test cheese batch to ensure safety <input type="checkbox"/></li> <li>- Other; please specify _____ <input type="checkbox"/></li> </ul> </li> <li>• Use sterile techniques when opening and resealing bulk bags of starter culture <input type="checkbox"/></li> <li>• Particular emphasis is given to the adherence to the prerequisite hygiene requirements <input type="checkbox"/></li> </ul>	<p><b>Control evidence is assisted by</b></p> <ul style="list-style-type: none"> <li>• Record* of developed acidity:               <ul style="list-style-type: none"> <li>- Titration <input type="checkbox"/></li> <li>- pH measurement (using a pH meter or pH strips) <input type="checkbox"/></li> <li>- Curd tests or inspection <input type="checkbox"/></li> </ul> </li> <li>• Record* of starter batch information <input type="checkbox"/></li> <li>• Record* what you did in response to the slow vat <input type="checkbox"/></li> </ul>
<p><b>Contamination in vat by harmful bacteria or foreign bodies from</b></p> <ul style="list-style-type: none"> <li>- Operatives</li> <li>- Equipment</li> <li>- Environment</li> </ul>		<p><b>*Note:</b> Many cheesemakers keep these records in the cheesemaking/production log or diary</p>

**Variations from or additions to stated hazards and controls listed on previous page for step 6**  
e.g. back sloping

Hazard What can go wrong	Control Measure Method of prevention	Documentation Evidence of control

**Step 6. Required improvements**

Step	Control measure to be introduced/changed	Deadline

**Step 7. Curds, salting, moulding and pressing**

Hazard What can go wrong	Control Measure (Tick where measure is in place)	Documentation (Tick where measure is in place)
<p><b>Growth/survival of harmful bacteria</b></p> <p>Inadequate/slow acid development before salting</p> <p>Incorrect salting:</p> <ul style="list-style-type: none"> <li>- Dry salting</li> <li>- Dry salt levels</li> <li>- Uneven salt distribution</li> </ul> <p>Brine:</p> <ul style="list-style-type: none"> <li>- Immersion time too short</li> <li>- Low brine salt concentration</li> <li>- Incorrect pH</li> </ul> <p><b>Contamination by harmful bacteria from</b></p> <ul style="list-style-type: none"> <li>- Equipment and operators during handling</li> <li>- Contaminated salt or brine</li> <li>- Wash water</li> </ul> <p><b>Foreign body contamination</b></p> <ul style="list-style-type: none"> <li>- From brine tanks</li> </ul>	<p><b>To prevent, eliminate or reduce hazards</b></p> <ul style="list-style-type: none"> <li>• Ensure correct pH is reached before salting <input type="checkbox"/></li> <li>• Produce and follow recipe defining:               <ul style="list-style-type: none"> <li>- Salt levels <input type="checkbox"/></li> <li>- Method of addition <input type="checkbox"/></li> </ul> </li> <li>• Produce and follow instructions for managing brine tank including:               <ul style="list-style-type: none"> <li>- Defined immersion times <input type="checkbox"/></li> <li>- Replenishment of brine tank <input type="checkbox"/></li> <li>- pH control <input type="checkbox"/></li> </ul> </li> <li>• Particular emphasis is given to adherence to prerequisite hygiene requirements <input type="checkbox"/></li> <li>• Protect dry salt <input type="checkbox"/></li> <li>• Brine:               <ul style="list-style-type: none"> <li>- Heat-treat <input type="checkbox"/></li> <li>- Make fresh brine if required <input type="checkbox"/></li> <li>- Maintain tank in a clean condition <input type="checkbox"/></li> </ul> </li> <li>• Use drinking quality (potable) water <input type="checkbox"/></li> <li>• Visually inspect and remove residual curds or other particles when needed <input type="checkbox"/></li> </ul>	<p><b>Control evidence</b></p> <ul style="list-style-type: none"> <li>• Record titratable acidity/pH <input type="checkbox"/></li> <li>• Written recipe outlining:               <ul style="list-style-type: none"> <li>- Dry salt levels <input type="checkbox"/></li> <li>- Salting procedures <input type="checkbox"/></li> </ul> </li> <li>• Brine tank management instructions <input type="checkbox"/></li> <li>• Record emersion times in cheesemaking log <input type="checkbox"/></li> <li>• Record salt replenishment <input type="checkbox"/></li> <li>• Brine test results (strength/pH/ hygiene tests) <input type="checkbox"/></li> <li>• Record brine heat treatment or replacement dates <input type="checkbox"/></li> <li>• Water analysis results <input type="checkbox"/></li> </ul>



**Variations from or additions to stated hazards and controls listed on previous page for step 7**

<b>Hazard</b> What can go wrong	<b>Control Measure</b> Method of prevention	<b>Documentation</b> Evidence of control

**Step 7. Required improvements**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

**Step 8. Ripening or Maturing**

Hazard (What can go wrong)	Control Measure (Tick where measure is in place)	Documentation (Tick where measure is in place)
<p><b>Growth/survival of harmful bacteria</b></p> <ul style="list-style-type: none"> <li>- Uneven moisture/salt distribution</li> <li>- Incorrect ripening conditions (relative humidity/temperature)</li> <li>- Incorrect ripening period</li> <li>- Environmental contamination:               <ul style="list-style-type: none"> <li>- During cheese handling (including rind washing)</li> <li>- During cheese storage</li> </ul> </li> </ul>	<p><b>To prevent, eliminate or reduce hazards:</b></p> <ul style="list-style-type: none"> <li>• Cheeses are turned to ensure even moisture and salt distribution <input type="checkbox"/></li> <li>• Shelving/rack surfaces permit adequate drainage <input type="checkbox"/></li> <li>• Visual inspections to prompt corrective action <input type="checkbox"/></li> <li>• Maintain required temperature _____ °C and relative humidity _____ <input type="checkbox"/></li> <li>• Remove cheese showing unacceptable faults <input type="checkbox"/></li> <li>• Correct stock control, cheese inspections (as cheese batches may not mature in chronological order) <input type="checkbox"/></li> <li>• Maintenance of clean premises/environment and pest control with effective "barriers" preventing contamination from other areas <input type="checkbox"/></li> <li>• Particular emphasis given to adherence to prerequisite hygiene requirements <input type="checkbox"/></li> <li>• Conduct tasks such as spiking/piercing; brushing/washing, or waxing according to specified schedule and in a hygienic manner; cheese wrapping, bandaging or coating <input type="checkbox"/></li> <li>• Careful handling to avoid cheese rind/coat damage <input type="checkbox"/></li> </ul>	<p><b>Examples of control evidence</b></p> <ul style="list-style-type: none"> <li>• Cheese recipe <input type="checkbox"/></li> <li>• Corrective action records <input type="checkbox"/></li> <li>• Record temperature and relative humidity <input type="checkbox"/></li> <li>• Record cheese faults and actions taken <input type="checkbox"/></li> <li>• Batch records <input type="checkbox"/></li> </ul>
<p><b>Contamination by harmful bacteria and foreign bodies from:</b></p> <ul style="list-style-type: none"> <li>- Operators</li> <li>- Equipment</li> <li>- Environment</li> </ul>		

**Variations from or additions to stated hazards and controls listed on previous page for step 8**  
(e.g. washed rind/smearing)

<b>Hazard</b> What can go wrong	<b>Control Measure</b> Method of prevention	<b>Documentation</b> Evidence of control

**Step 8. Required improvements**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

**Step 9. Cutting, packaging and storage**

Hazard (What can go wrong)	Control Measure (Tick where measure is in place)	Documentation (Tick where measure is in place)
<p><b>Growth/survival of harmful bacteria due to:</b></p> <p>Cheese handling operations:</p> <ul style="list-style-type: none"> <li>- Packaging soft cheese</li> <li>- Cutting cheese portions</li> <li>- Dressing cheese "coats"</li> </ul> <p>Environmental contamination:</p> <ul style="list-style-type: none"> <li>- During cheese handling</li> <li>- During cheese storage</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>- All dressing, cutting, potting or packaging equipment</li> <li>- Packaging materials</li> </ul> <p><b>Growth of harmful bacteria</b></p> <ul style="list-style-type: none"> <li>- High storage temperature</li> <li>- Prolonged storage periods</li> </ul>	<p><b>To prevent, eliminate or reduce hazards:</b></p> <p><b>Cutting/packaging</b></p> <p>Strict adherence to the prerequisites hygiene requirements:</p> <ul style="list-style-type: none"> <li>• Good personal hygiene <input type="checkbox"/></li> <li>• Staff training <input type="checkbox"/></li> <li>• Maintenance of clean premises/environment and pest control with effective "barriers" preventing contamination from other areas <input type="checkbox"/></li> <li>• Scheduled cleaning of all related equipment <input type="checkbox"/></li> <li>• Storage of all equipment in a clean environment <input type="checkbox"/></li> <li>• Correct storage and handling of packaging materials <input type="checkbox"/></li> </ul> <p><b>Cheese storage after cutting/packaging</b></p> <ul style="list-style-type: none"> <li>• Packaged cheese is stored at &lt; _____ °C <input type="checkbox"/></li> <li>• Tolerance periods are defined <input type="checkbox"/></li> <li>• Good stock control <input type="checkbox"/></li> </ul>	<p><b>Control evidence is assisted by:</b></p> <ul style="list-style-type: none"> <li>• Evidence of adequate supervision and/or training <input type="checkbox"/></li> <li>• Record daily chill temperatures <input type="checkbox"/></li> <li>• Batch and stock records <input type="checkbox"/></li> </ul>

**Variations from or additions to stated hazards and controls listed on previous page for step 9**

e.g. washed rind/smearing

<b>Hazard</b> What can go wrong	<b>Control Measure</b> Method of prevention	<b>Documentation</b> Evidence of control

**Step 9. Required improvements**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

**Step 10. Additional step**  
e.g. distribution, farmers markets etc.

<b>Hazard</b> What can go wrong	<b>Control Measure</b> Method of prevention <b>To prevent, eliminate or reduce hazards</b>	<b>Documentation</b> Evidence of control <b>Control evidence is assisted by</b>

**Step 10. Required improvements**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

**Summary of Improvements or Changes Required**

<b>Step</b>	<b>Control measure to be introduced/changed</b>	<b>Deadline</b>

## Identification of CCPs

In the tables on pages 32-51 you identified control measures to control hazards in all the steps in your business. Now you should identify the steps which are considered to be Critical Control Points (CCPs) which will need extra monitoring to ensure that control is being maintained.

### HOW TO IDENTIFY CCPs

1. For each step in your business work through the following three questions:

Questions	Answers
Does the step involve a control measure or measures to prevent, eliminate, or reduce one or more hazards to an acceptable level?	Yes/No
For each control measure is it the last chance to control the hazard or is it essential for the success of a later CCP?	Yes/No
Can the control measure(s) be monitored at this step (either visually or by taking a measurement)?	Yes/No

2. If you answer 'Yes' to all three questions then the control measure is a CCP. Once you have identified the CCPs, complete the summary table on page 54 by setting the critical limits, the approach to monitoring, corrective action (should there be a deviation from the limit) and the record used for monitoring. See text below for further details.

**Note: When you answer these questions, you will typically find that you have a small number of CCPs in your business.**

### CRITICAL LIMITS FOR CCPs

Each CCP should have a specific critical limit. Critical limits separate acceptability from unacceptability in terms of product safety.

They are set for observable or measurable parameters which can demonstrate that the critical point is under control, e.g. temperature, time, pH, moisture content, additive, preservative or salt level, sensory parameters such as visual appearance or texture, etc.

Critical limits may be derived from a variety of sources. When not taken from legislation, international standards, this workbook, or guides to good hygiene practices, you should be able to present evidence that they are valid.

### MONITORING OF CCPs

Monitoring is done to demonstrate that the critical limit at a CCP has not been exceeded.

You should decide the following in relation to monitoring:

- When? - i.e. frequency of monitoring
- How? - i.e. method of monitoring
- Who? - i.e. allocate responsibility for the monitoring and recording

The results of monitoring should be recorded (see documentation and records below).



## Identification of CCPs (continued)

### **CORRECTIVE ACTION WHEN THERE'S A DEVIATION FROM A CRITICAL LIMIT**

The purpose of corrective action is to prevent unsafe food reaching the customer. For each CCP, corrective actions should be planned in advance so that they can be taken without hesitation when monitoring indicates a deviation from a critical limit.

You should decide the following in relation to corrective action:

- Who? - i.e. allocate responsibility for implementation and recording of the corrective action
- How? - i.e. (i) description of means and action required to correct the observed deviation and (ii) action to be taken with regard to products that have been manufactured during the period when the process was out of control

**Note: If there is nothing you can do to make the cheese safe after a critical limit has been exceeded then the cheese should be discarded.**

**Corrective actions taken should be recorded.**

### **DOCUMENTATION AND RECORDS**

A completed version of this workbook plus any additional related procedures you might develop can be considered to be your 'HACCP documentation'.

Monitoring results, corrective actions taken and verification activities should always be recorded. A cheesemaking/production log book (see sample on page 55) is a useful way to keep these records.

Legally, you must keep your records for at least three years and make them available to your dairy produce inspector (DPI) upon request.

### **VERIFICATION OF HACCP-BASED PROCEDURES**

The purpose of verification is to demonstrate that your food safety management system has been implemented as planned and that hazards are being controlled

Regularly, you should:

- Review the records to ensure that:
  - Monitoring is taking place
  - Corrective actions are being taken where deviation from the critical limits occur
- Inspect operations to ensure that the prerequisite hygiene requirements are being implemented
- Test against the process hygiene and food safety microbiological criteria as per Article 4 of Reg. 2073/2005 (see Appendix 3)

Annually and whenever there is a change in the operation that could influence food safety you should:

- Review this workbook to ensure that all steps in your operation are included and that your controls are valid.

You should record the date of scheduled reviews on page 59 in Section 6.

# Summary of CCPs in your Business

(Use the 3 questions on page 52 to help you identify the CCPs)

Step	Hazard (source)	Control Measure	Critical limit(s)	Monitoring	Corrective Action	Record name	Verification
e.g. - Batch pasteurisation*	e.g. - Survival of pathogenic bacteria (Inadequate temperature/in-adequate holding time)*	e.g. - Adequate heat treatment for sufficient time period*	e.g. - $\geq 63^{\circ}\text{C}$ for 30 mins*	e.g. - Visual monitor of the thermography/temperature gauge Correct heater thermostat setting Supervision to ensure minimum heating time*	e.g. - If temperature drops below $63^{\circ}\text{C}$ , adjust heater thermostat and heat for corresponding time Ensure thermostat is operating correctly*	e.g. - Thermograph record Cheesemaking log*	e.g. - Phosphatase test, reviewing monitoring records of critical limit, microbiological analysis.

\*Note: This CCP is an example only and the parameters may not apply to your process in particular or at all

# Sample Cheesemaking/ Production Log

Date	Quantity of Starter
Quantity of Milk	Quantity of Rennet

	Time	Temperature	Acidity or pH	Comments
<b>Milk</b>				
<b>Starter added</b>				
<b>Rennet added</b>				
<b>Cutting</b>				
<b>Washing</b>				
<b>Resting</b>				
<b>Draining</b>				
<b>Pressing</b>				
<b>Turned</b>				
<b>Turned</b>				
<b>Into brine</b>				
<b>Out of brine</b>				

Number of cheeses made	Batch Code
Notes	





# 06

## Declaration of Completion of this Workbook

I hereby certify that I:

(name)

---

(position)

---

of (business name)

---

have completed this workbook and produced HACCP based procedures for this business at (address):

---

The following person(s) is / are responsible for ensuring that the HACCP based procedures are implemented:

(position)

---

(position)

---

(position)

---

(position)

---

I will review the HACCP based procedures at least once a year and also if my operations change.

**Signed**

---

**Date**

---

### Scheduled Reviews

Review date	Date review completed	Signature

# Appendix 1

## Health Requirements for Raw Milk and Colostrum Production

Regulation (EC) No. 853/2004 contains health requirements for raw milk and colostrums. Below is an extract from Annex III, Section IX, Chapter I, part I (1)-(5).

**Note: To ensure compliance with the legal requirements you are advised to read the relevant legislation and not rely solely on the extract below.**

For the purpose of this Section:

1. 'Colostrum' means the fluid secreted by the mammary glands of milk producing animals up to three to five days post parturition that is rich in antibodies and minerals, and precedes the production of raw milk
2. 'Colostrum-based products' means processed products resulting from the processing of colostrums or from the further processing of such processed products

### CHAPTER I. RAW MILK AND COLOSTRUM – PRIMARY PRODUCTION

Food business operators producing or, as appropriate, collecting raw milk and colostrum must ensure compliance with the requirements laid down in this Chapter.

#### I. HEALTH REQUIREMENTS FOR RAW MILK AND COLOSTRUM PRODUCTION

1. Raw milk and colostrum must come from animals:
  - (a) that do not show any symptoms of infectious diseases communicable to humans through milk and colostrum
  - (b) that are in a good general state of health, present no sign of disease that might result in the contamination of milk and colostrum and, in particular are not suffering from any infection of the genital tract with discharge, enteritis with diarrhoea and fever, or a recognisable inflammation of the udder
  - (c) that do not have any udder wound likely to affect the milk and colostrum
  - (d) to which no unauthorised substances or products have been administered and that have not undergone illegal treatment within the meaning of Directive 96/23/EC
  - (e) in respect of which, where authorised products of substances have been administered, the withdrawal periods prescribed for these products or substances have been observed.

## Appendix 1

### Health Requirements for Raw Milk and Colostrum Production (continued)

2. (a) in particular, as regards brucellosis, raw milk and colostrum must come from:
    - (i) cows or buffaloes belonging to a herd which, within the meaning of Directive 64/432/EEC<sup>(1)</sup>, is free or officially free of brucellosis;
    - (ii) sheep or goats belonging to a holding officially free or free of brucellosis within the meaning of Directive 91/68/EEC<sup>(2)</sup>; or
    - (iii) females of other species belonging, for species susceptible to brucellosis, to herds regularly checked for that disease under a control plan that the competent authority has approved
  - (b) as regards tuberculosis, raw milk and colostrum must come from:
    - (i) cows or buffaloes belonging to a herd which, within the meaning of Directive 64/432/EEC, is officially free of tuberculosis; or
    - (ii) females of other species belonging, for species susceptible to tuberculosis, to herds regularly checked for this disease under a control plan that the competent authority has approved
  - (c) If goats are kept together with cows, such goats must be inspected and tested for tuberculosis.
3. However, raw milk from animals that does not meet the requirements of point 2 may be used with the authorisation of the competent authority.
    - (a) in the case of cows or buffaloes that do not show a positive reaction to tests for tuberculosis or brucellosis, nor any symptoms of these diseases, after having undergone a heat treatment such as to show a negative reaction to the alkaline phosphatase test;
    - (b) in the case of sheep or goats that do not show a positive reaction to tests for brucellosis, or which have been vaccinated against brucellosis as part of an approved eradication programme, and which do not show any symptom of that disease, either:
      - (i) for the manufacture of cheese with a maturation period of at least two months; or
      - (ii) after having undergone heat treatment such as to show a negative reaction to the alkaline phosphatase test; and
    - (c) in the case of females of other species that do not show a positive reaction to tests for tuberculosis or brucellosis, nor any symptoms of these diseases, but belong to a herd where brucellosis or tuberculosis has been detected after the checks referred to in point 2(a)(iii) or 2(b)(ii), if treated to ensure its safety.
  4. Raw milk and colostrum from any animal not complying with the appropriate requirements of points 1 to 3, and in particular, any animal showing individually a positive reaction to the prophylactic tests vis-à-vis-tuberculosis or brucellosis as laid down in Directive 64/432/EEC and Directive 91/68/EEC, must not be used for human consumption.
  5. The isolation of animals that are infected, or suspected of being infected, with any of the diseases referred to in point 1 or 2 must be effective to avoid any adverse effect on other animals milk and colostrum.

1 Council Directive 64/432/EEC of 26 June 1964 on animal health problems affecting intra-Community trade in bovine animals and swine (OJ L21, 29.7.1964, p. 1977/64) Directive as last amended by Regulation (EC) No 21/2004 (OJ L 5, 9.1.2004, p. 8).

2 Council Directive 91/68/EEC of 28 January 1991 on animal health conditions governing intra-Community trade in ovine and caprine animals (OJ L 46, 19.2.1991, p. 19). Directive as last amended by Commission Decision 2005/932/EC.



## Appendix 2

# Requirements Concerning Dairy and Colostrum-Based Products

**Note: To ensure compliance with the legal requirements you are advised to read the relevant legislation and not rely solely on the extract below.**

Regulation (EC) No. 853/2004 contains requirements for milk and colostrums. The following are extracts from **Annex III, Section IX Chapter I (part III) and Chapter II (parts I-III)**:

### **CRITERIA FOR RAW MILK**

**Extract from Regulation EC No. 1662/2006 amending Regulation (EC) No. 853/2004.**

**Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.**

**Note: It is possible to produce milk of a better quality, i.e. lower somatic cell counts and lower plate counts at 30°C, than the legal limits. Whether you are producing your own raw milk or purchasing it, you should aim for it to have a plate count at 30°C of < 20,000 per ml and a somatic cell count of < 250,000 per ml.**

## Appendix 2

### Requirements Concerning Dairy and Colostrum-Based Products (continued)

#### Extract from Annex III, Section IX, Chapter I, part III:

#### III. CRITERIA FOR RAW MILK AND COLOSTRUM

1. (a) The following criteria for raw milk apply pending the establishment of standards in the context of more specific legislation on the quality of milk and dairy products.  
(b) National criteria for colostrum, as regards plate count, somatic cell count or antibiotic residues, apply pending the establishment of specific Community legislation.
2. A representative number of samples of raw milk and colostrum collected from milk production holdings taken by random sampling must be checked for compliance with points 3 and 4 in case of raw milk and with the existing national criteria referred to in point 1(b) in case of colostrum. The checks may be carried out by, or on behalf of:
  - (a) the food business operator producing the milk;
  - (b) the food business operator collecting or processing the milk;
  - (c) a group of food business operators, or
  - (d) in the context of a national or regional control scheme.
3. (a) Food business operators must initiate procedures to ensure that raw milk meets the following criteria:-

(i) for raw cows' milk:

• Plate count at 30°C (per ml)	• ≤ 100,000 (*)
• Somatic cell count (per ml)	• ≤ 400,000 (**)
• (*) Rolling geometric average over a two-month period, with at least two samples per month.	
• (**) Rolling geometric average over a three-month period, with at least one sample per month, unless the competent authority specifies another methodology to take account of seasonal variations in production levels	

(ii) for raw milk from other species:

• Plate count at 30°C (per ml)	• ≤ 1,500,000 (*)
• (*) Rolling geometric average over a two-month period, with at least two samples per month	

- (b) However, if raw milk from species other than cows is intended for the manufacture of products made with raw milk by a process that does not involve any heat treatment, food business operators must take steps to ensure that the raw milk used meets the following criterion:

• Plate count at 30°C (per ml)	• ≤ 500,000 (*)
• (*) Rolling geometric average over a two-month period, with at least two samples per month	

4. Without prejudice to Directive 96/23/EC, food business operators must initiate procedures to ensure that raw milk is not placed on the market if either:
  - (a) it contains antibiotic residues in a quantity that, in respect of any one of the substances referred to in Annexes I and III to Regulation (EEC) No. 2377/90 (1), exceeds the levels authorised under that Regulation; or
  - (b) the combined total of residues of antibiotic substances exceeds any maximum permitted value.
5. When raw milk fails to comply with point 3 or 4, the food business operator must inform the competent authority and take measures to correct the situation.

## Appendix 2

### Requirements Concerning Dairy and Colostrum-Based Products (continued)

**Extract from Annex III, Section IX, Chapter I, part III:**

#### **CHAPTER II: REQUIREMENTS CONCERNING DAIRY AND COLOSTRUM-BASED PRODUCTS**

##### **I. Temperature Requirements**

1. Food business operators must ensure that, upon acceptance at a processing establishment,
  - (a) milk is quickly cooled to not more than 6°C;
  - (b) colostrum is quickly cooled to not more than 6°C or maintained frozen, and kept at that temperature until processed.
2. However, food business operators may keep milk and colostrum at a higher temperature if:
  - (a) processing begins immediately after milking, or within four hours of acceptance at the processing establishment;  
or
  - (b) the competent authority authorises a higher temperature for technological reasons concerning the manufacture of certain dairy or colostrum-based products.

##### **II. Requirements for Heat Treatment**

1. When raw milk, colostrum, dry or colostrum-based products undergo heat treatment, food business operators must ensure that this satisfies the requirements laid down in Chapter XI of Annex II to Regulation (EC) No. 852/2004. In particular, they shall ensure, when using the following processes that they comply with the specifications mentioned:
  - (a) Pasteurisation is achieved by a treatment involving:
    - (i) a high temperature for a short time (at least 72°C for 15 seconds);
    - (ii) a low temperature for a long time (at least 63°C for 30 minutes); or
    - (iii) any other combination of time-temperature conditions to obtain an equivalent effect, such that the products show, where applicable, a negative reaction to an alkaline phosphatase test immediately after such treatment.
  - (b) Ultra high temperature (UHT) treatment is achieved by a treatment:
    - (i) involving a continuous flow of heat at a high temperature for a short time (not less than 135°C in combination with a suitable holding time) such that there are no viable micro-organisms or spores capable of growing in the treated product when kept in an aseptic closed container at ambient temperature, and
    - (ii) sufficient to ensure that the products remain microbiologically stable after incubating for 15 days at 30°C in closed containers or for seven days at 55°C in closed containers or after any other method demonstrating that the appropriate heat treatment has been applied.

## Appendix 2

### **Requirements Concerning Dairy and Colostrum-Based Products** (continued)

2. When considering whether to subject raw milk and colostrum to heat treatment, food business operators must:
  - (a) have regard to the procedures developed in accordance with the HACCP principles pursuant to Regulation (EC) No 852/2004; and
  - (b) comply with any requirements that the competent authority may impose in this regard when approving establishments or carrying out checks in accordance with Regulation (EC) No 854/2004.

#### **III Criteria for Raw Cows Milk**

1. Food business operators manufacturing dairy products must initiate procedures to ensure that, immediately before being heat treated and if its period of acceptance specified in the HACCP-based procedures is exceeded:
  - (a) raw cows' milk used to prepare dairy products has a plate count at 30°C of less than 300,000 per ml; and
  - (b) heat treated cows milk used to prepare dairy products has a plate count at 30°C of less than 100,000 per ml.
2. When milk fails to meet the criteria laid down in paragraph 1, the food business operator must inform the competent authority and take measures to correct the situation.

## Appendix 3

# Microbiological Criteria, Environmental Sampling for *Listeria monocytogenes* and Shelf-life Studies

**Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.**

### **Food safety and process hygiene criteria for cheese**

Regulation EC No. 2073 of 2005 outlines two types of microbiological criteria:

#### **Food safety criterion (see page 70)**

A criterion defining the acceptability of a product or a batch of foodstuff applicable to products placed on the market.

#### **Process hygiene criterion (see page 72)**

A criterion indicating the acceptable functioning of the production process. Such a criterion is not applicable to products placed on the market. It sets an indicative contamination value above which corrective actions are required in order to maintain the hygiene of the process in compliance with food law.

Article 4 of the Regulation requires cheesemakers to test against the cheese specific process hygiene and food safety criteria when they are validating and verifying their HACCP based procedures.

**Note: Regulation EC No. 2073 of 2005 does not include criteria for all pathogens relevant for cheese, e.g. *E. coli* O157. However, the Regulation governing food law in general, i.e. Regulation (EC) No. 178 of 2002, requires that unsafe food is not placed on the market. This means that ready-to-eat food should not contain pathogens or their toxins at unsafe levels.**

### **Sampling frequency**

For cheese, Regulation EC No. 2073 of 2005 does not stipulate the frequency of testing; this is a decision for the cheesemaker. In making the decision, cheesemakers should bear in mind the purpose of these legal microbiological criteria, i.e. to validate or verify the correct functioning of the HACCP based procedures, and the prerequisite hygiene requirements.

## Appendix 3

### Microbiological Criteria, Environmental Sampling for *Listeria monocytogenes* and Shelf-life Studies (continued)

#### Environmental sampling for *Listeria monocytogenes*

Regulation EC No. 2073 of 2005 requires cheesemakers producing cheese which may pose a *Listeria monocytogenes* risk for public health, to sample the processing areas and equipment for *Listeria monocytogenes* as part of their routine sampling programme.

**Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.**

#### Shelf-life studies

Regulation EC No. 2073 of 2005 requires cheesemakers to conduct shelf-life studies on their products as necessary. In particular, this applies to cheese able to support the growth of *Listeria monocytogenes* and that may pose a *Listeria monocytogenes* risk for public health. The Regulation outlines the following requirements for shelf-life in general:

#### Extract from Regulation EC No. 2073 of 2005 in relation to shelf-life studies

The studies referred to in Article 3(2) shall include:

- Specifications for physico-chemical characteristics of the product, such as pH, aw, salt content, concentration of preservatives and the type of packaging system, taking into account the storage and processing conditions, the possibilities for contamination and the foreseen shelf-life and
- Consultation of available scientific literature and research data regarding the growth and survival characteristics of the micro-organisms of concern

When necessary on the basis of the abovementioned studies, the food business operator shall conduct additional studies, which may include:

- Predictive mathematical modelling established for the food in question, using critical growth or survival factors for the micro-organisms of concern in the product
- Tests to investigate the ability of the appropriately inoculated micro-organism of concern to grow or survive in the product under different reasonably foreseeable storage conditions
- Studies to evaluate the growth or survival of the micro-organisms of concern that may be present in the product during the shelf-life under reasonably foreseeable conditions of distribution, storage, and use

The above mentioned studies shall take into account the inherent variability linked to the product, the micro-organisms in question and the processing and storage conditions.

## Appendix 3

### Microbiological Criteria, Environmental Sampling for *Listeria monocytogenes* and Shelf-life Studies (continued)

#### ***Listeria monocytogenes***

The Commission has prepared two guidance documents on shelf-life studies in relation to *Listeria monocytogenes*. The first is for food businesses and the second for laboratories.

**1. European Commission (2008) Guidance Document on *Listeria monocytogenes* shelf-life studies for ready-to-eat foods under Regulation (EC) No. 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs**

[http://www.fsai.ie/uploadedFiles/EU\\_Guidance\\_listeria\\_monocytogenes/pdf](http://www.fsai.ie/uploadedFiles/EU_Guidance_listeria_monocytogenes/pdf)

The aim of this document is to guide food business operators producing ready-to-eat foods to:

- Demonstrate to the satisfaction of the competent authority, that the products will comply with the Community Regulation until the end of the shelf-life
- Understand the range of different approaches available to help establish a safe product shelf-life in relation to *Listeria monocytogenes* and to decide the appropriate approach for their products
- Classify their products into ready-to-eat foods in which growth of *Listeria monocytogenes* can occur or in ready-to-eat foods in which growth of *Listeria monocytogenes* will not occur during their shelf-life

**2. European Commission (2008) Technical Guidance Document on shelf-life laboratory durability and challenge studies for *Listeria monocytogenes* in ready-to-eat foods**

[http://www.fsai.ie/uploadedFiles/EU\\_Guidance\\_shelflife\\_listeria\\_monocytogenes\\_en.pdf](http://www.fsai.ie/uploadedFiles/EU_Guidance_shelflife_listeria_monocytogenes_en.pdf)

This document was prepared by the EU Community Reference Laboratory (CRL) for *Listeria monocytogenes* in collaboration with a working group consisting of ten laboratories.

The document is aimed at laboratories conducting shelf-life studies for *Listeria monocytogenes* in ready-to-eat foods on behalf of food business operators, and it provides recommendations on how to select, implement, and perform the tests required. It describes the microbiological procedures for determining growth of *Listeria monocytogenes* using challenge tests and durability studies in the frame of the application of the application of Regulation (EC) No. 2073/2005.

## FOOD SAFETY CRITERIA FOR CHEESES

Extract from Regulation EC No. 2073 of 2005 as amended

**Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.**

Food category	Micro-organisms/ their toxins, metabolites	Sampling ng plan <sup>(1)</sup>		Limits <sup>(2)</sup>			Analytical reference method <sup>(3)</sup>	Stage where the criterion applies
		n	c	m	M			
1.2 Ready-to-eat foods able to support the growth of <i>L. monocytogenes</i> , other than those intended for infants and for special medical purposes	<i>Listeria monocytogenes</i>	5	0	100			EN/ISO 11290-2 <sup>(6)</sup>	Products placed on the market during their shelf-life
		5	0	cfu/g <sup>(5)</sup>				
1.3 Ready-to-eat foods unable to support the growth of <i>L. monocytogenes</i> , other than those intended for infants and for special medical purposes <sup>(4)</sup> <sup>(5)</sup>	<i>Listeria monocytogenes</i>	5	0	Absence in 25g <sup>(7)</sup>			EN/ISO 11290-2 <sup>(6)</sup>	Before the food has left the immediate control of the food business operator, who has produced it
1.11 Cheeses, butter and cream made from raw milk or milk that has undergone a lower heat treatment than pasteurisation <sup>(6)</sup>	<i>Salmonella</i>	5	0	Absence in 25g			EN/ISO 6579	Products placed on the market during their shelf-life
1.21 Cheeses, milk powder and whey powder, as referred to in the coagulase-positive staphylococci criteria in Chapter 2.2 of this Annex	<i>Staphylococcal enterotoxins</i>	5	0	Not detected in 25g			European screening method of the CRL for coagulase-positive staphylococci criteria <sup>(3)</sup>	Products placed on the market during their shelf-life

<sup>(1)</sup> n = number of units comprising the sample; c = number of sample units giving values between m and M

<sup>(2)</sup> For points 1.1 – 1.25 m = M

<sup>(3)</sup> The most recent edition of the standard shall be used

<sup>(4)</sup> Regular testing against the criterion is not required in normal circumstances for the following ready-to-eat foods: those which have received heat treatment or other processing effective to eliminate *Listeria monocytogenes*, when recontamination is not possible after this treatment (for example, products heat treated in their final package),

- fresh, uncut and unprocessed vegetables and fruits, excluding sprouted seeds,
- bread, biscuits and similar products,
- bottled or packed waters, soft drinks, beer, cider, wine, spirits and similar products,
- sugar, honey and confectionary, including cocoa and chocolate products,
- live bioactive molluscs.

<sup>(5)</sup> This criterion shall apply if the manufacturer is able to demonstrate, to the satisfaction of the competent authority, that the product will not exceed the limit 100 cfu/g throughout the shelf-life. The operator may fix intermediate limits during the process that must be low enough to guarantee that the limit of 100 cfu/g is not exceeded at the end of shelf-life.

<sup>(6)</sup> 1 ml of inoculum is plated on a Petri dish of 140 mm diameter or on three Petri dishes of 90 mm diameter.

<sup>(7)</sup> This criterion shall apply to products before they have left the immediate control of the producing food business operator, when he is not able to demonstrate, to the satisfaction of the competent authority, that the product will not exceed the limit of 100 cfu/g throughout the shelf-life.

<sup>(8)</sup> Products with pH ≤ 4.4 or aw ≤ 0.92, products with pH ≤ 5.0 and aw ≤ 0.94, products with a shelf-life of less than five days shall be automatically considered to belong to this category. Other categories of products can also belong to this category, subject to scientific justification.

<sup>(9)</sup> Excluding products when the manufacturer can demonstrate to the satisfaction of the competent authorities that, due to the ripening time and aw of the product where appropriate, there is no *salmonella* risk.

<sup>(10)</sup> Reference: Community reference laboratory for coagulase positive staphylococci. European screening method for the detection of *Staphylococcal enterotoxins* in milk and milk products



## FPROCESS HYGIENE CRITERIA FOR CHEESE

Extract from Regulation EC No. 2073 of 2005 as amended

**Note: To ensure compliance with the legal microbiological criteria you are advised to read the relevant legislation and not rely solely on the summary below.**

Food category	Micro-organisms	Sampling plan (1)		Limits (2)		Analytical reference method (3)	Stage where the criterion applies	Action in case of unsatisfactory results
		n	c	m	M			
2.2.2 Cheeses made from milk or whey that has undergone heat treatment	<i>E. coli</i> (5)	5	2	100 cfu/g	1 000 cfu/g	ISO 16649-1 or 2	At the time during the manufacturing process when the <i>E. coli</i> count is expected to be highest (6)	Improvements in production hygiene and selection of raw materials
2.2.3 Cheeses made from raw milk	Coagulase-positive staphylococci	5	2	10 <sup>4</sup> cfu/g	10 <sup>5</sup> cfu/g	EN/ISO 6888-2	At the time during the manufacturing process when the number of staphylococci is expected to be highest	Improvements in production hygiene and selection of raw materials. If values > 10 <sup>5</sup> cfu/g are detected, the cheese batch has to be tested for staphylococcal enterotoxins
2.2.4 Cheeses made from milk that has undergone a lower heat treatment than pasteurisation (7) and ripened cheeses made from milk or whey that has undergone pasteurisation or a stronger heat treatment (7)	Coagulase-positive staphylococci	5	2	100 cfu/g	1 000 cfu/g	EN/ISO 6888-1 or 2		
2.2.5 Unripened soft cheeses (fresh cheeses) made from milk or whey that has undergone pasteurisation or a stronger heat treatment (7)	Coagulase-positive staphylococci	5	2	10 cfu/g	100 cfu/g	EN/ISO 6888-1 or 2	End of the manufacturing process	Improvements in production hygiene. If values > 10 <sup>5</sup> cfu/g are detected, the cheese batch has to be tested for staphylococcal enterotoxins

(1) n = number of units comprising the sample; c = number of sample units giving values between m and M

(2) For points 2.2.7, 2.2.9 and 2.2.10 m = M

(3) The most recent edition of the standard shall be used

(4) The criterion shall not apply to products intended for further processing in the food industry

(5) *E. coli* is used here as an indicator for the level of hygiene

(6) For cheeses which are not able to support the growth of *E. coli*, the *E. coli* count is usually the highest at the beginning of the ripening period, and for cheeses which are able to support the growth of *E. coli*, it is normally at the end of the ripening period

(7) Excluding cheeses where the manufacturer can demonstrate, to the satisfaction of the competent authorities, that the product does not pose a risk of staphylococcal enterotoxins

# Appendix 4

## Reference Material

### KEY LEGISLATION

**Note: The following lists the main pieces of legislation which are subject to amendment. For a comprehensive and up to date list of all relevant legislation, see the FSAI website [www.fsai.ie](http://www.fsai.ie) or contact the FSAI Advice Line 1890 33 66 77.**

**General food law:** Regulation (EC) No. 178 of 2002 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, as amended

**Hygiene of food and feed:** Regulation (EC) No. 853/2004 (OJ L226, p22, 25/06/2004) of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin, as amended.

**Microbiological criteria for foodstuffs:** Commission Regulation (EC) No. 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs as amended

### Guidance Material

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## Appendix 5

# Acknowledgements

**The FSAI and Teagasc wish to thank the Food Standards Agency UK for making its HACCP workbook (*Specialist Cheesemakers - Food Safety Workbook*) available to this project. This workbook is based on the UK workbook and the experience of people involved in its development and implementation. In particular, we wish to thank Chris Pratt (Food Standards Agency); Randolph Hodgson (Neal's Yard Dairy); Alan Lyne (ADAS); Jamie Montgomery (Montgomery's Cheddar) and; Sandy and Andy Rose (Two Hoots Cheese).**

### MEMBERS OF THE WORKING GROUP

The FSAI and Teagasc would especially like to thank the farmhouse cheesemakers who participated on the working group for this project. We would also like to thank those who received and commented on drafts of the workbook including the Department of Agriculture, Fisheries and Food.

<b>Name</b>	<b>Organisation</b>
Tim Camon	Food Safety Authority of Ireland
Pat Farrell	Carrigaline Farmhouse Cheese
Lucy Hayes	Mount Callan Farmhouse Cheese
Kieran Jordan	Moorepark Food Research Centre, Teagasc
Eamonn Lonergan	Knockanore Farmhouse Cheese
Sara McSweeney	Moorepark Food Research Centre, Teagasc
Martina O'Brien	Moorepark Food Research Centre, Teagasc
Lisa O'Connor	Food Safety Authority of Ireland
Marion Roeleveld	Killeen Farmhouse Cheese
Gudrun Shinnick	Fermoy Natural Cheese Company